9-2008

The Incidence of Tobacco Taxation: Evidence from Geographic Micro-Level Data

Andrew Hanson
Georgia State University

Ryan S. Sullivan
Syracuse University

Andrew Young School of Policy Studies
Research Paper Series

Working Paper 08-30
September 2008

Department of Economics
Fiscal Research Center

The Incidence of Tobacco Taxation: Evidence from Geographic Micro-Level Data

Andrew Hanson
Georgia State University

Ryan Sullivan
Syracuse University

Georgia State University | Andrew Young School of Policy Studies

The Incidence of Tobacco Taxation: Evidence from Geographic Micro-Level Data

Andrew Hanson
Department of Economics, Georgia State University
P.O. Box 3992
Georgia State University
Atlanta, GA 30302
ahanson@gsu.edu

Ryan Sullivan
Department of Economics, Syracuse University
110 Eggers Hall
Syracuse University
Syracuse, NY 13244
rssulliv@maxwell.syr.edu

Abstract:

This paper uses a recent increase in the state of Wisconsin's tobacco tax as a natural experiment to measure the economic incidence of tobacco taxation. We estimate the economic incidence of tobacco taxation using micro level data on cigarette prices collected from retail locations in Wisconsin and states that share its border. We find that Wisconsin's $1.00 increase in tobacco tax was over-shifted to consumers; they pay the entire amount of the tax as well as a premium of between $0.08 and $0.17 per pack of cigarettes. We use geo-coded data to test if the incidence of the tobacco tax in Wisconsin is different for retail locations near another state's border (where taxation is different). We find that retail locations near another state's border still pass along the entire amount of the tax to consumers, but the premium charged over the amount of the tax is reduced by between 13 and 54 percent depending on the distance in question and the econometric specification.

Introduction

The federal government collected over $7.7 billion in revenue from tobacco taxes in 2006 (U.S. Treasury, 2007). In addition to federal collections every state collects a tobacco tax, with the most recent tabulation showing that state governments as a whole collect $15.2 Billion annually in tobacco taxes (U.S. Census, 2008).[1] Texas collects the largest dollar amount of tobacco taxes at over $1.3 Billion, while North Dakota collects the smallest at just over $24 million annually (U.S. Census, 2008). On average tobacco taxes represent about 2.25 percent of state revenues, and range from a high of 6.4 percent of revenues in New Hampshire to a low of less than one half of one percent of revenues in South Carolina (U.S. Census, 2008).

Tobacco taxation is an important revenue source in every state and at the federal level, and is also intended as a policy to reduce tobacco consumption.[2] A key component to understanding how effective a tobacco tax is at reducing consumption is how the economic incidence of the tax is split between consumers and producers. If the full burden of a tobacco tax is passed on to consumers in the form of higher prices it is more likely to discourage consumption. The incidence of tobacco taxation is also important for policy makers concerned with the fairness aspect of how revenues are raised. Tobacco taxation is typically considered to be a regressive tax because tobacco users tend to be low income individuals.[3] The actual burden of a tobacco tax on low income individuals will ultimately depend on how much (if any) of the tax is passed on to consumers.

---

[1] This figure does not include additional sales taxes collected on tobacco.

[2] The economic justification for government intervention in the market for tobacco products is that tobacco use (especially smoking tobacco) causes a negative externality. For studies that measure the external effects of tobacco use see Shoven et al. (1989), Manning et al. (1989, 1991), Gravelle and Zimmerman (1994), Viscusi (1995, 2002), Evans et al. (1999), Cutler et al. (2000), and Sloan et al. (2004). For studies that measure the mortality cost per pack see Gruber and Koszegi (2001), Cutler (2002), Sloan et al. (2004), and Viscusi and Hersch (2008). There have been a wide variety of studies that analyze demand for cigarettes, notably Becker et al. (1994), Evans et al. (1999), and Gruber and Koszegi (2001). See Chaloupka and Warner (2000) for a comprehensive review of studies on cigarette demand.

[3] See Poterba (1989), Fullerton and Metcalf (2002), and Gravelle (2007) for a review of this literature.

Previous studies that estimate the incidence of tobacco and cigarette taxation find a wide range of answers. The results of these studies range from finding that the tax burden is over-shifted to consumers (they pay the full tax plus a premium on top of the tax amount) to concluding that tobacco taxes do not raise prices by the amount of the tax. Harris (1987) and Keeler et. al. (1996) both provide evidence using state level data that shows the burden of tobacco taxation is over-shifted to consumers, although their estimates on the size of over-shifting differ dramatically. Sumner and Wohlgenant (1985) estimate that only the amount of the tax is passed on to consumers, while Ashenfelter and Sullivan (1987) suggest that excise tax increases do not consistently act to increase retail prices.[4]

We determine how the economic burden of a tobacco tax is divided between retail suppliers of cigarettes and consumers by estimating the retail price response to a recent $1.00 change in Wisconsin's state cigarette tax. Our study is unique from previous estimates of tobacco tax incidence in several ways. First, our price data come from a unique survey of retail establishments that sell cigarettes; we have data from over 1,000 locations at the store level. Our micro-level data allow flexibility in our estimation strategy including the opportunity to test the incidence of generic and name brand tobacco products separately, and also provide the opportunity to test the validity of many of our primary identification assumptions. We are also able to differentiate between the response of different types of retail establishments including tobacco specialty stores, grocers, and convenience stores. In addition, our data are geo-coded so we are able to test the price responsiveness of retailers that are near a bordering state where tax treatment is different.

[4] Estimates on the incidence of general sales taxes find that the amount of tax burden passed on to consumers varies substantially across the type of product used to create the estimates, although many estimates show evidence of substantial over-shifting (see Besley and Rosen, 1999 and Poterba, 1996).

We find that the $1.00 tax increase results in a statistically significant retail price increase of between $1.08 and $1.17 depending on the econometric specification we use, the type of cigarettes, and the type of retail establishment. We find consistent evidence of over-shifting across both panel and repeated cross section econometric specifications, and for both name brand and generic cigarettes. We also show that the amount of over-shifting is sensitive to how far the retail establishment is from the Wisconsin border, and that stores near the border lose about between 13 and 54 percent of the over-shifting premium enjoyed by stores further from the border, although this result is statistically quite imprecise.

The remainder of the paper begins by giving the details behind Wisconsin's tobacco tax change, and lays out our identification strategy for estimating the incidence of tobacco taxation. We follow with a description of our unique micro-level data on cigarette prices at retail establishments. The third section of the paper presents and discusses our regression results for estimating the incidence of tobacco taxation; it also includes a discussion of potential criticisms of our methodology. The final section of the paper concludes.

Policy Change Background and Identification Strategy

We use a recent increase in the tax on cigarettes in the state of Wisconsin as a natural experiment to identify the incidence of tobacco taxation. Beginning January 1, 2008 Wisconsin increased the state tax on cigarettes by $1.00, from $0.77 to $1.77 per pack.[5] While the cigarette tax increased by over 125 percent in Wisconsin with the start of the New Year[6], the states that

[5] WI Act 20, amend sec. 139.31(1) (a) and (b), signed into law on October 26, 2007.

[6] We expect an immediate response in the retail price of cigarettes on January 1, 2008 because of the way the new tax is collected. According to conversations with administrators at the Wisconsin Department of Revenue the Wisconsin tobacco tax increase was also levied on inventories of cigarettes at the retail level on January 1, 2008. Store owners were required to pay the new tax on all cigarettes in inventory as of January 1, 2008. Although this raises some concerns about the price response of retailers prior to the tax change, it means that we expect an immediate price response when the tax is enacted.

share a border with Wisconsin did not change the tax treatment of cigarettes at that time. Table 1 shows the tax on cigarettes in Wisconsin and surrounding states before and after the tax increase took effect. As shown in Table 1, Wisconsin went from having the lowest tax on cigarettes to having the second highest in the group of states that share its border.

We use the differential change in Wisconsin and absence of change in states that share its border to identify how the tax affects the retail tax inclusive price, and thus measure the incidence of the tax.[7] The policy change we use is a substantial tax increase compared to other recent tobacco tax changes. Since January 1, 2000 there have been 83 separate state level cigarette tax increases,[8] with a median increase of $0.39 per pack. Wisconsin's $1.00 increase matches the largest one time tobacco tax increase by any state since 2000, as shown in Table 2.[9]

Our primary method used to identify the retail price response to the tax change is difference-in-differences (D-D). We compare the difference in the retail price of cigarettes in Wisconsin with surrounding states before the tax change (December, 2007) with the difference in prices between Wisconsin and surrounding states after the tax change (January, 2008). The main advantage of using this method is that it controls for any fixed characteristics about Wisconsin as well as any time trends that affect all states that may also change cigarette prices.

Using the D-D method requires two primary assumptions. The first is that there are no factors other than the tax increase that affect the change in cigarette prices between December 2007 and January 2008 in Wisconsin. This assumption seems particularly reasonable given that

---

[7] Wisconsin has a "minimum mark up" law on the retail sale of cigarettes. This law, [s. 100.30, Stats.], requires retail cigarette venders to sell cigarettes for at least 6 percent more than the cost of buying them from a wholesaler or manufacturer. Because of this law, retailers would require a cost adjustment from wholesalers to legally adjust their prices by less than the amount of the tax increase.

[8] Oregon is the only state to decrease the tobacco tax during this time period, doing so by $0.10 at the beginning of 2004.
Source: http://www.taxadmin.org/fta/rate/cig_inc02.html

[9] Iowa, Maine, Maryland, Montana, South Dakota, and Texas also increased the tax per pack of cigarettes by $1 since 2000.

the time elapsed between our surveys is at most 42 days. The second assumption is that prices in our control states (IA, IL, MI, and MN) are not affected by the policy change in Wisconsin. Our data show that this assumption is not violated on average, as the price change in our control states is less than $0.01 for our full sample.

We implement the D-D identification strategy using both data from a panel and repeated cross section of stores. The regression used to determine the effect of the tax increase using the panel data is as follows:

$$(1) \qquad (P_{i,jan} - P_{i,dec}) = \alpha + \beta_1(\text{Wisconsin}) + \varepsilon_i$$

Where "Wisconsin" is a dummy variable equal to one if the store is located in that state, and P is the tax inclusive price of cigarettes for store i in either January or December. Using a panel of stores and the change in price as our dependent variable means that we control for any attributes of the store that remain constant between December, 2007 and January, 2008 such as the type of retail establishment (for example whether the store is a convenience or grocery store), and it's location. Because we have information about the type of retail establishment we run regressions for Equation (1) using our entire panel as well as separate regressions for various types of establishments, and for stores that are within a short distance of the state border.

The parameter of interest in Equation (1) is β_1, which shows how the $1 tax increase in Wisconsin effects the change in cigarette prices. If $\beta_1 < 1$, this implies that the full burden of the tax is not passed on to consumers, some of the tax burden falls on cigarette retailers. If $\beta_1 = 1$, then the burden of the cigarette tax increase is fully realized by consumers in the form of higher prices. If $\beta_1 > 1$, this would be evidence that the tax on cigarettes is "over-shifted" to consumers, they bear the entire burden of the tax and pay a premium above the tax amount. If the tax is over-shifted to consumers it is likely that the retail market for cigarettes is imperfect (see

Fullerton and Metcalf, 2002 for a detailed discussion on the theoretical models of tax incidence that produce over-shifting).

We also implement the D-D identification strategy using a repeated cross section of stores in our data. This strategy allows us to use all stores for which we have price data on in at least one time period (December or January). The regression used to determine the effect of the tax increase using the repeated cross section of stores is as follows:

$$(2) \qquad P_{i,t} = \alpha + \beta_1(\text{Wisconsin}) + \beta_2(\text{January}) + \beta_3(\text{Wisconsin*January}) + Z_i'\gamma + \varepsilon_i$$

Where, as in the panel regression, "Wisconsin" is a dummy variable equal to one if the store is located in that state. For cross-section identification, P is the tax inclusive price from store i in time period t, where t is either December, 2007 or January, 2008. "January" is a dummy variable equal to one if the observation is from the period after the tax increase. Z is a vector of control variables that includes a dummy variable indicating whether the store is a national retailer, a dummy variable indicating if the store is a tobacco only retailer, a convenience store, or grocery a store, and the distance to the state border (depending on the specification used). Z also includes a dummy variable for the state level location of the store. The coefficient of interest in Equation (2) is β_3, which has the same interpretation as β_1 in Equation (1).

Data

Our data come from telephone surveys of cigarette retailers at tobacco specialty, grocery, and convenience stores in Wisconsin, Illinois, Minnesota, Iowa, and the upper peninsula of Michigan. We created a list of 1,542 stores that sell cigarettes in these states using phone book listings and internet searches by geography.[10] We contacted each establishment in December,

[10] We created the majority of our store list using an internet search engine and searching "tobacco store" and "convenience store" by geography for each state in our sample. This search provided the store name, phone number, and address for the stores in our sample.

2007 (before the tax increase) and again in January, 2008 (after the tax increase) to request the retail price of cigarettes.

We implemented the first phase of surveys between December 17, 2007 and December 23, 2007. In the pre-tax change wave, 70 percent of stores provided price information, for a total of 1072 data points.[11] We implemented the second phase of surveys between January 9, 2008 and January 28, 2008. A total of 1107 stores provided cigarette price information in the post-tax change phase, a 72 percent response rate.[12] We create our panel using the 65 percent of stores on our list (1002 stores) that provided price information in both the pre-tax change and post-tax change phases.

We requested price information on two types of cigarettes from the stores in our survey; a premium brand and generic brand.[13] Our survey consisted of the following questions:

- "What is the price per pack of *Name Brand* Cigarettes?"
- "Does that price of *Name Brand* cigarettes include the sales and tobacco tax?"
- "What is the price per pack of *Generic Brand* Cigarettes?"
- "Does that price of *Generic Brand* cigarettes include the sales and tobacco tax?"

A total of 614 (57 percent) out of the 1072 stores that gave price information for the name brand cigarettes in the first phase also gave price information for the generic brand cigarettes. In the second phase, 641 (58 percent) out of the 1107 stores that gave price information on the name brand also gave price information on the generic brand.

---

[11] 470 stores did not give price information in the first wave of surveys. Of these, 68 did not sell cigarettes, 82 were either a wrong phone number or a disconnected line, 134 refused to give cigarette price information over the phone, 163 did not answer our calls, and the remaining 23 were not used because of reliability concerns.

[12] 435 stores did not give price information in the second wave of surveys. Of these, 40 did not sell cigarettes, 94 were either a wrong number or a disconnected line, 115 refused to give cigarette price information over the phone, 137 did not answer our calls, and the remaining 49 were not used because of reliability concerns.

[13] To keep consistent across locations we asked for the same name and generic brand from each store surveyed.

We merged information on state, county, and city sales taxes, gathered from each state's department of revenue,[14] with our price data to calculate the tax-inclusive price for each observation. The sales tax rates used to calculate the tax-inclusive price are listed in the appendix by city. Wisconsin, Illinois, and Iowa have different sales tax rates across cities, while cities in the upper peninsula of Michigan all have a 6 percent sales tax rate. In addition to the state of Illinois tobacco taxes, Cook County, IL has an additional $2.00 tax per pack, and the city of Chicago has an additional $0.68 tax per pack. We contacted each state department of revenue (as well as city and county where appropriate) to ensure that there were no other changes, besides the $1 per pack increase in Wisconsin, made to sales or cigarette taxes between December 17, 2007 and January 28, 2008 for the cities in our sample.

Our survey covers 270 cities, 106 (39 percent) are located in Wisconsin, 43 (16 percent) in Minnesota, 30 (11 percent) in the upper peninsula of Michigan, 65 (24 percent) in Illinois, and 26 (10 percent) are located in Iowa. Of the 1002 stores used to create our panel data, 423 (42 percent) are located in Wisconsin, 186 (19 percent) are located in Minnesota, 60 (6 percent) are located in Michigan, 221 (22 percent) are located in Illinois, and 112 (11 percent) are located in Iowa.

We classified the stores in our data by retail establishment type based on the store name. We classified stores as tobacco specialty, grocery, or convenience stores. We were also able to differentiate those that were national chain stores from local or regional establishments. Out of the 1002 stores in our panel data, 101 (10 percent) are tobacco specialty stores, 148 (15 percent)

[14] State, county, and city sales tax rates are available online at: http://www.revenue.state.il.us/, http://www.iowa.gov/tax, http://www.revenue.wi.gov, http://www.michigan.gov/treasury, http://www.taxes.state.mn.us/.

are grocery stores, and the remaining 753 (75 percent) are convenience stores. About 40 percent (406 stores) are national chain retailers.

In addition to information about the type of retail establishment, we also have the street address for each store in our sample. We use GIS software to calculate the distance from the Wisconsin border for each store in our sample. Of the stores in our sample we were able to locate 941 (94 percent) of the addresses exactly. For the remaining 6 percent of stores that we could not match exactly, we use the center of the city or county where the store is located in to measure the distance to the nearest Wisconsin border. In our data, 194 (19 percent of our panel) are stores located within 5 miles of the Wisconsin border. Of the stores located within 5 miles of the Wisconsin border, 84 (43 percent) are in Wisconsin, 42 (22 percent) are in Minnesota, 30 (15 percent) are in Illinois, 20 (10 percent) are in Michigan, and 18 (9 percent) are located in Iowa. The average distance to the nearest border state for stores located in Wisconsin in our sample is 36 miles, with a standard deviation of 28 miles. The average distance to the border for stores located in states surrounding Wisconsin is 63 miles, with a standard deviation of 70 miles.

Table 3 (name brand) and 4 (generic) provide a summary of our price data across several dimensions. The average price of name brand cigarettes in the pre-tax change survey is $4.36. In the post tax-change survey the average price of name brand cigarettes increased by almost $0.50 to $4.85. Important for our identification strategy, the average price for name brand cigarettes in our control states (IL, MN, MI, IA) did not change by more than $0.06 (MI). The average price of generic brand cigarettes in the pre-tax change survey is $3.83. In the post tax-change survey the average price of generic brand cigarettes increased by $0.46 to $4.29. The average price of the generic brand cigarettes changed fairly substantially in two of our control states, which violates one of our identification assumptions for difference-in-difference

estimation. The average price of the generic brand cigarettes increased by $0.14 in Illinois, and by $0.10 in Michigan. The standard deviation of price for the generic brand is also the largest in Illinois and Michigan at over $0.60 per pack.

Table 3 (name brand) and 4 (generic) also show how our price data differs for stores that are within 5 miles of the Wisconsin state border. As table 3 shows, the average price of name brand cigarettes in all states except Minnesota for stores within 5 miles of the Wisconsin border is less than the price at other stores in the state. The discount for stores near the border is largest in Illinois, where stores within 5 miles of the Wisconsin border have an average price that is about $0.76 less than other stores in the state. The border discount is also substantial in Michigan and Iowa, where stores within 5 miles of the Wisconsin border have an average price that is between $0.23 and $0.33 per pack less than other stores in those states. A similar pattern does not emerge for the price of the generic brand cigarettes at stores located within 5 miles of the Wisconsin border.

Estimates of Tobacco Tax Incidence

Using our unique micro level data on the retail price of cigarettes in Wisconsin and surrounding states we can make several comparisons that allow us to identify the economic incidence of the tobacco tax increase. Figure 1 shows a visual representation of the price changes that occur between December, 2007 (before the tax increase) and January, 2008 (after the tax increase) at the locations in our sample for both the generic and name brand cigarettes. Each dot in Figure 1 represents the price change of a retail location between December 2007 and January 2008. As shown by the maps in Figure 1, prices in Wisconsin increased almost universally by more than the $1 tax for both the generic and name brand cigarettes. Figure 1 also

displays how well the Border States work as a control group, as most locations in other states did not change cigarette prices at all between December, 2007 and January, 2008.

To get a precise estimate of the price response to the tax change exemplified by Figure 1, we estimate Equations (1) and (2) using data from our survey of cigarette retailers. Regression results using the panel data estimating Equation (1) show that not only do consumers pay the entire $1 per pack tax increase, but they pay between a $0.12 and $0.17 premium on top of the tax increase. As shown in column one of Table 5, we estimate the coefficient of interest in Equation (1), β_1, to be equal to about 1.12 for name brand cigarettes and about 1.17 for the generic brand using the full sample of retail locations. Both of these results are precisely estimated, as they are statistically different from zero at less than the one-percent level. The 95 percent confidence interval for the estimates in column one also shows that the point estimates are significantly larger than $1, evidence that the tax increase caused a larger price increase than the amount of the tax.

Columns 2-5 of Table 5 show regression results for various types of retail establishments in the panel data. These results confirm the finding that the $1 tax per pack increase is more than passed on to consumers in the form of higher prices, and that this result is not unique to the type of retail establishment. The results for both the generic and name brand cigarettes sold at grocery and convenience stores, columns 4 and 5 of Table 5, show that β_1 is less than $0.01 different than the coefficient using the entire sample, indicating no unique response from these types of stores. The estimates for β_1 in the specification using data from stores that are tobacco specialty establishments is about $1.10 for the name brand and about $1.13 for the generic, roughly $0.03 to $0.04 less than the full sample estimates. The tobacco specialty store estimates suggest that these stores do not include as large a premium above the tax as other stores, which

implies that this type of retail store does not possess the same degree of market power that other types of stores in our survey do.

Regression results estimating Equation (2), shown in columns one and two of table 6, using the cross-section data for name brand cigarettes reinforce the findings from the panel data estimates. Column (1) shows the cross section results without using the indicator variables for the type of retail establishment, and column (2) shows the estimates controlling for the type of retail establishment. The coefficient of interest in each case, β_3, which is comparable to β_1 in the panel regression, is within \$0.01 of the panel estimates confirming over-shifting of the tobacco tax that we estimate in the panel regressions. The 95 percent confidence interval for each of these estimates is larger than the panel regressions; however our results are still significantly different from zero at the one percent level.

Columns (3) and (4) of table 6 show the regression results for estimating Equation (2) using the cross section data for the generic brand cigarettes. Column (3) shows the cross section results without controls, and column (4) shows the results controlling for the type of retail establishment. The coefficient of interest, again β_3, is quite a bit lower than the comparable β_1 from the panel regressions. We estimate the price increase as a result of the tax change is approximately \$1.09 for generic brand cigarettes using the repeated cross section data, roughly \$0.08 less than the estimate using the panel data. Again, these results are statistically significant at the one percent level, with the confidence interval indicating that 95 percent of the distribution is greater than \$1.00. Although the cross section results for the generic brand cigarettes suggest a smaller premium than the panel results they still show evidence of substantial over-shifting of the tax burden on to consumers.

The difference in the coefficient estimate between the panel and repeated cross section for generic cigarettes is likely caused by the substantial decrease in the grocery store premium. As the grocery store coefficient in column (4) of table 6 shows, grocery stores sell the generic brand cigarettes for about $0.05 less than other stores, however the panel estimates for grocery stores indicate that they actually raised their price more than other stores. It seems that the grocery stores that responded to our survey both in January and December were more likely to have raised their price more for the generic brand cigarettes than those who only responded in one of the surveys. The coefficient for tobacco only stores shows that stores specializing in tobacco products sell both name brand ($0.40) and generic ($0.26) for substantially less than the other types of stores surveyed.

Our estimates of the incidence of tobacco taxation are that the $1.00 tax increase is over-shifted to consumers by between $0.08 and $0.17 depending on the econometric specification and the type of cigarettes used in estimating. Our estimates are similar in magnitude to Keeler et. al. (1996) that estimates a $1 increase in the tobacco tax would increase the price of cigarettes by $1.11. This is encouraging, considering that Keeler et. al. use annual state level data (from 1960 to 1990) and identifies the parameter of interest from a series of state tax changes. Both the Keeler et. al. estimate and the estimates presented here are substantially smaller than the estimate by Harris (1987) that suggests a $1.00 increase in the cigarette tax would result in a retail price increase of over $2.00.

The over-shifting of the tobacco tax on to consumers that we find in our estimates is consistent with an imperfect market for cigarettes. An explanation for market imperfection is offered by Becker et. al. (1994). Becker proposes that because cigarette companies work as an oligopoly, they obtain maximum profit by raising the price of their product on addicted smokers.

The profit gained from increasing price on addicted smokers offsets the future losses from the reduced smoking by casual or new smokers that results from the price increase.

Estimates of Tobacco Tax Incidence by Geography

As noted in the background section and by table 1, Wisconsin shares a border with states that have a range of tobacco tax rates from $0.98 to $2.00. Because of the possibility for casual smuggling[15] in areas close to the border, demand elasticity may vary by proximity to the state border. It is likely that cigarette demand is more inelastic for consumers that are further from a state border, as it is more costly (in terms of time and travel expense) to avoid the tax. If demand for cigarettes near the border is more elastic, then the price increase from the tax change should be smaller at stores closer to the border of Wisconsin than at stores further from the border.[16]

We can test for the possibility that the incidence of the tobacco tax varies across distance from the state border using our geo-coded data and altering our econometric specifications in Equation (1) and (2). To test the effect that distance from the state border has on how the tax incidence is divided we group our data into stores that are within one, five, ten, and twenty-five miles of the state border. We create an indicator variable equal to one for each of these groupings and run separate regressions using panel data with following econometric specification:

$$(3)\ (P_{i,jan} - P_{i,dec}) = \alpha + \beta_1(\text{Wisconsin}) + \beta_2\ (\text{Inside Mile}) + \beta_3\ (\text{Inside Mile*Wisconsin}) + \varepsilon_i$$

Where "Inside Mile" is an indicator variable that is equal to one if a store is within one, five, ten, or twenty-five miles of the state border depending on the specification. The coefficient of interest is β_3, which, if different from zero, tells us that stores within our distance boundaries

[15] See Baltagi and Levin (1986), Gruber, et. al. (2003), Stehr (2005), and Lovenheim (2008) for studies on cross border cigarette smuggling.
[16] We assume that the supply curve for retail cigarettes has a constant elasticity across state geography.

split the incidence of the tobacco tax differently with consumers than those further from the border. Notice that the β_2 coefficient in the panel specification is not a general distance premium as the dependent variable is the change in the price of cigarettes. We run separate regressions for each measure of distance; the results are presented in table 7 for the name brand cigarettes and table 8 for the generic brand.

As column (1) of table 7 shows, cigarette retailers located within one mile of the Wisconsin border do not over-shift the amount of the tobacco tax by as much as those further from the border for name brand cigarettes. The point estimate for the β_3 coefficient in this specification suggests that retailers within one mile of the Wisconsin border over-shift by about $0.02 less than stores further from the border for name brand cigarettes. The standard errors and 95 percent confidence interval show this estimate is quite imprecise, however, it does suggest that demand extremely close to a state border may be more elastic than demand further from the border.

The results in columns (2), (3), and (4) of table 7 also offer suggestive evidence that the tax burden is not over-shifted by retail cigarette outlets near the border as much as it is further from the border for name brand cigarettes. These specifications use an indicator variable for stores that are five, ten and twenty five miles from the border respectively. As the β_3 point estimate shows, stores close to the border lose about $0.02 of the premium they are able to charge on top of the tax increase at stores further from the border for name brand cigarettes. Again, the standard errors in each of these specifications is too large to attach statistical significance to, however, they are smaller than those reported for the one mile specification. The 95 percent confidence interval in each column shows the bulk of the distribution is negative, suggesting that stores near the border face a more elastic demand curve than stores further from the border.

Using our panel data for generic brand cigarettes we find more suggestive evidence that retailers near the Wisconsin border are not able to over-shift the burden of the tax as much as retailers further from the border. Table 8 presents estimation results for Equation (3) using our panel data for generic brand cigarettes. These results suggest that the demand elasticity difference for generic brand cigarettes near the border is greater than the name brand cigarettes, as the β_3 coefficient is as large as \$0.05 for stores located within one mile of the Wisconsin border. As with the name brand results, the standard errors are large, and we cannot attach statistical significance to these results, however the bulk of the 95 percent confidence interval is less than zero suggesting that indeed stores near the border are not able to over-shift the burden of the tax by as much as stores further from the border.

To test the effect that distance has on the incidence of tobacco taxation using cross sectional data we use the following econometric specification:

$$(4)\ P_{i,t} = \alpha + \beta_1(\text{Wisconsin}) + \beta_2(\text{January}) + \beta_3(\text{Wisconsin*January}) + \beta_4(\text{Inside Mile}) + \beta_5(\text{Inside Mile*Wisconsin}) + \beta_6(\text{January*Inside Mile}) + \beta_7(\text{Wisconsin*January*Inside Mile}) + Z_i'\gamma + \varepsilon_i$$

Where, as in Equation (2) the Z_i represents store level characteristics and includes a set of state level dummy variables. The interaction variables allow us to isolate the effect that distance has on the incidence of the tobacco tax in the β_7 coefficient, it is the combined effect of the tax (being in Wisconsin and after the tax increase in January) and of being close to the border as measured in one, five, ten, and twenty-five mile groups. The β_4 coefficient for the cross section specification gives us an estimate of the general premium or discount that retail outlets near the Wisconsin border are subject to, which we could not obtain using the panel specification. As with the panel data, we run separate regressions for each measure of distance using the cross

section data and Equation (4). Table 9 and 10 show estimation results for Equation (4) using each measure of distance.

As the β_7 coefficient in column (1) of table 9 shows, cigarette retailers located within one mile of the Wisconsin border do not over-shift the amount of the tobacco tax by as much as those further from the border for name brand cigarettes. The point estimate suggests a larger discount than the panel specification; however the standard errors for this specification are so large relative to the point estimate that precise comparison to the panel estimate is not appropriate. The β_7 coefficient in the five, ten, and twenty five mile specifications also suggest that being close to the border affects how much of the tax burden is over-shifted to consumers. The point estimates using our cross section data for name brand cigarettes are larger than the panel estimates, and suggest that the discount for being close to the border is between \$0.01 and \$0.07, or between 13 and 54 percent[17] of the over-shifting premium; however we cannot attach statistical significance to these estimates.

Using our cross section data for generic brand cigarettes we find further suggestive evidence that retailers near the Wisconsin border are not able to over-shift the burden of the tax as much as retailers further from the border. Table 10 presents estimation results for Equation (4) using our cross sectional data for generic brand cigarettes. As with the panel, these results suggest that the demand elasticity difference for generic brand cigarettes near the border is greater than for the name brand cigarettes, as the β_7 coefficient is as large as \$0.13 for stores located within ten miles of the Wisconsin border. The standard errors are also large in every specification, and we cannot attach statistical significance to these results. The bulk of the 95 percent confidence interval, however, is less than zero suggesting that indeed stores near the

[17] Percentage is based on the premium from our panel and cross section regressions without using distance in tables 5 and 6, the distance premium is taken from the β_7 coefficient in tables 7 and 9.

border are not able to over-shift the burden of the tax by as much as stores further from the border.

The coefficient on the "inside mile" variable (β_4) in the cross sectional specification suggests that the retail price of cigarettes at stores a short distance from the Wisconsin border is significantly lower than the retail price at stores further from the border. The point estimates for β_4 suggest that the price of generic brand cigarettes near the Wisconsin border is between \$0.04 and \$0.13 lower than the price at stores further from the border. These estimates are statistically different from zero for the five, ten, and twenty five mile specifications. The point estimates for the name brand regression reflect a larger border discount, between \$0.35 and \$0.49 (statistically different than zero) depending on the specification.

On balance the results presented in tables 7, 8, 9 and 10 show that retailers near the Wisconsin border do not over-shift the burden of the tax increase by as much as stores located in the interior of the state. This result is suggestive evidence that demand is more elastic near the border than it is further from the border.

Methodology Concerns and Robustness Checks

There are two main criticisms about our methodology for identifying the incidence of tobacco taxation that we have not yet addressed. The first is that although we look at prices in Wisconsin before and after the tax change, we cannot rule out that there are other factors that are causing prices to change besides the tax increase. The second is that retail cigarette outlets in Wisconsin may be changing the price of their product prior to the date of the tax increase in response to the looming law change and this response biases our estimates.

The difference-in-difference identification strategy we use assumes that the price change that would have occurred in Wisconsin in the absence of the tax change is equal to the price change

that actually occurred over the same time period in the Border States. We believe that our assumption is reasonable considering that the average price change in Border States for the name brand cigarettes was less than $0.01 and generic brand cigarettes was $0.01. This does not rule out that other factors in Wisconsin do not change during the period of our data, however.

We are aware of one other minor law change in Wisconsin that may have also altered the price of cigarettes besides the tax. Beginning January 1st, 2008, Wisconsin began offering a free two-week supply of tobacco cessation medication to anyone requesting it through a toll-free phone call. The medication includes nicotine patches, gum and lozenges.[18] The offer is for a one time supply and ranges in value between $50 and $100 and lasts for approximately two months. We believe that any potential bias in our estimates from this program would work toward lowering our estimated coefficients. We are not aware of any other law change or trends that would affect our results.

To examine how serious a concern altering prices in response to the expected tax change is, we administered a secondary survey of establishments in our sample to ask them about this possibility. We randomly selected fifty stores in Wisconsin from our sample and asked them about the timing of their price changes as a result of the tax increase. Specifically, we asked the establishment manager if they had changed prices on exactly January 1st, 2008. 49 out of the 50 store managers surveyed stated that they had changed prices exactly on January 1st. The lone exception stated that they had waited until about a week after January 1st to increase prices. We also asked if they had changed cigarette prices prior to the January 1st tax policy change. None of the 50 respondents in our survey stated that they changed prices in anticipation of the tax change. Although the sample size is quite small, we believe that these survey results are

[18] University of Wisconsin Center for Tobacco Research and Intervention "Quit Line." http://www.ctri.wisc.edu/.

supportive evidence that our assumption that cigarette prices did not change in anticipation of the tax change is reasonable.

Conclusion

Tobacco taxes represent about $22 billion dollars annually in federal and state government revenues. Although the statutory incidence of these taxes falls on tobacco sellers, the economic incidence is often assumed to fall largely on tobacco consumers. The evidence we present here suggests that not only do consumers pay the entire economic burden of the tobacco tax, but that they also pay a premium in addition to the amount of tax. We find that the incidence of tobacco taxation is over-shifted to consumers by between 8 and 17 percent of the amount of the tax. The amount of over-shifting of the tobacco tax we find is similar to that found by Keeler et. al. (1996), although our data and methodology differ substantially.

Our paper is unique in that we are able to estimate how sensitive the tax incidence is to the distance that a retail location is from the state border (where taxes are different). We show that the amount of over-shifting is sensitive to how far the retail establishment is from a state border, as stores near the border lose between 13 and 54 percent of the over-shifting premium. The loss in over-shifting premium is consistent with recent evidence presented by Lovenheim (2008) on casual cigarette smuggling across state borders. The relationship between cigarette prices, smuggling, and distance to a state's border suggests that policy makers may want to coordinate tax rates or tax rate increases with neighboring states if the goal is to reduce tobacco consumption.

The premium paid on top of the tobacco tax is likely the result of the structure of the market for cigarettes, and is probably paid by addicted smokers to offset the profit lost from those who stop smoking (or never start) as suggested by Becker et. al. (1994). Although our results are

consistent with the model suggested by Becker et. al. we cannot directly test who among the population of smokers pays the tax using our data. More research on the consumption response to tobacco tax changes is necessary to determine if it is long-term or addicted smokers who pay the tax or if these taxes prevent new smokers from starting.

References

Ashenfelter, Orley, and Daniel Sullivan.
"Nonparametric tests of market structure: an application to the cigarette industry." *Journal of Industrial Economics* 35 No. 4 (June 1987) 483-98.

Baltagi, Badi H., and Dan Levin.
"Estimating Dynamic Demand for Cigarettes Using Panel Data: The Effects of Bootlegging, Taxation and Advertising Reconsidered." *The Review of Economics and Statistics* 68 No.1 (February, 1986): 148-55.

Becker, Gary S., Michael Grossman, and Kevin Murphy.
"An empirical analysis of cigarette addiction." *American Economic Review* 84 No. 3 (June, 1994): 396-418.

Besley, Timothy, and Harvey S. Rosen
"Sales Taxes and Prices: An empirical Analysis." *National Tax Journal* 52 No. 2 (June 1999): 157-78.

Chaloupk, Frank J., and Kenneth E. Warner.
"The Economics of Smoking." In *The Handbook of Health Economics, v.1B*, edited by Anthony Culyer and Joseph Newhouse, 1539-627. Amsterdam: Elsevier, 2000.

Cutler, David M., Arnold M. Epstein, Richard Frank, Raymond Hartman, Charles King III, Joseph P. Newhouse, Meredith B. Rosenthal, and Elizabeth Richardson Vigdor.
"How Good Was the Tobacco Settlement?: Assessing Payments to Massachusetts." *Journal of Risk and Uncertainty* 21 No. 2-3 (November, 2000) 235-61.

Cutler, David M. 2002.
"Health Care and the Public Sector." *Handbook of Public Economics*, edited by Alan J. Auerbach and Martin Feldstein, 2145-2243. North Holland: Elsevier Science, 2002.

Evans, William, Jeanne S. Ringel, and Diana Stech.
"Tobacco Taxes and Public Policy to Discourage Smoking. " In *Tax Policy and the Economy*, edited by James Poterba, 1-55. Cambridge, MA: MIT Press, 1999.

Federation of Tax Administrators
"Cigarette Tax Increases 2000-2008." http://www.taxadmin.org/fta/rate/cig_inc02.html. Accessed June 24, 2008.

Fullerton, D. and G.E. Metcalf
"Tax Incidence." *Handbook of Public Economics*, edited by Alan J. Auerbach and Martin Feldstein, 1787-872. Elsevier. Amsterdam, 2002.

Gravelle, Jane.
"The Cigarette Tax Increase to Finance SCHIP." Washington, DC: Congressional Research Service, June 19, 2007.

Gravelle, Jane, and Dennis Zimmerman.
"Cigarette Taxes to Fund Health Care Reform: An Economic Analysis." Washington, DC: Congressional Research Service, March 8, 1994.

Gruber, Jonathan, and Botond Koszegi.
"Is Addiction Rational? Theory and Evidence." *Quarterly Journal of Economics* 116 No. 4 (November, 2001): 1261-1303.

Gruber, Jonathan, Anindya Sen, and Mark Stabile.
"Estimating Price Elasticities When There Is Smuggling: The Sensitivity of Smoking to Price in Canada." *Journal of Health Economics* 22 No. 5 (September, 2003): 821-42.

Harris, Jeffrey E.
"The 1983 Increase in the Federal Cigarette Excise Tax." In *Tax Policy and the Economy*, edited by Lawrence H. Summers, 87-111. Cambridge, MA: MIT Press, 1987.

Illinois Department of Revenue
"Tax Rate Finder." http://www.revenue.state.il.us/. Accessed February 5, 2008.

Iowa Department of Revenue
"Sales Tax Rate Look Up." http://www.iowa.gov/tax. Accessed February 5, 2008.

Keeler, Theodore E., Teh-wei Hu, Paul G. Barnett, Willard G. Manning, and Hai-Yen Sung.
"Do cigarette producers price-discriminate by state? An empirical analysis of local cigarette pricing and taxation." *Journal of Health Economics* 15 No. 4 (August, 1996): 499-512.

Lovenheim Michael F.
"How Far to the Border?: The extent and Impact of Cross-Border Casual Cigarette Smuggling." *National Tax Journal* 61 No. 1 (March, 2008): 7-33.

Manning, Willard G., Emmett B. Keeler, Joseph P. Newhouse, Elizabeth M. Sloss, and Jeffrey Wasserman.
"Taxes of Sin: Do Smokers and Drikers Pay Their Own Way?" *Journal of the American Medical Association* 261 No. 11: (March, 1989): 1604-9.

Manning, Willard G., Emmett B. Keeler, Joseph P. Newhouse, Elizabeth M. Sloss, and Jeffrey Wasserman.
The Costs of Poor Health Habits. Cambridge, MA: Harvard University Press, 1991.

Michigan Department of Revenue
"Taxes." http://www.michigan.gov/treasury. Accessed February 5, 2008.

Minnesota Department of Revenue
"Sales and Use Tax." http://www.taxes.state.mn.us/. Accessed February 5, 2008.

Poterba, James M.
"Lifetime Incidence and the Distribution Burden of Excise Taxes" *American Economic Review*79 No. 2 (May, 1989): 325-31.

Poterba, James M.
"Retail Price Reactions to Changes in State and Local Sales Taxes." *National Tax Journal* 49 No. 2 (June, 1996): 165-76.

Shoven, John B., Jeffrey O. Sundberg, and John P. Bunker.
"The Social Security Cost of Smoking." In *Economics of Aging*, edited by David Wise, 231-51. Chicago: University of Chicago Press, 1989.

Sloan, Frank A., Jan Ostermann, Gabriel Picone, Christopher Conover, and Donald H. Taylor, Jr.
The Price of Smoking. Cambridge, MA: MIT Press, 2004.

Stehr, Mark.
"Cigarette Tax Avoidance and Evasion." *Journal of Health Economics* 24 No. 2 (March, 2005): 278-97.

Sumner, Daniel A., and Michael K. Wohlgenant.
"Effects of an Increase in the Federal Excise Tax on Cigarettes. *American Journal of Agricultural Economics* 67 No. 2 (May, 1985): 235-42.

University of Wisconsin Center for Tobacco Research and Intervention
"Quit Line." http://www.ctri.wisc.edu/. Accessed July 16, 2008.

U.S. Treasury, Alcohol and Tobacco Tax and Trade Bureau.
"Cumulative Summary, Fiscal Year 2006." www.ttb.gov. Accessed June 24, 2008.

U.S. Census Bureau.
"State Government Tax Collections." http://www.census.gov/govs/www/statetax.html. Accessed June 24, 2008.

Viscusi, Kip W.
"Cigarette Taxation and the Social Consequences of Smoking." In *Tax Policy and the Economy*, edited by James Poterba. 51-101. Cambridge: MIT Press, 1995.

Viscusi, Kip W.
Smoke-Filled Rooms: A Postmortem on the Tobacco Deal. Chicago: University of Chicago Press, 2002.

Viscusi, Kip W., and Joni Hersch
"The Mortality Cost to Smokers." NBER Working Paper No. 13599. Cambridge, MA: National Bureau of Economics Research, 2008.

Wisconsin Department of Revenue
"Tax Rates." http://www.dor.state.wi.us/. Accessed February 5, 2008.

Table 1: State Cigarette Tax Per Pack

	December '07	January '08
Illinois[a,b,c]	$0.98	$0.98
Iowa[c]	$1.36	$1.36
Michigan	$2.00	$2.00
Minnesota	$1.485	$1.485
Wisconsin[c]	$0.77	$1.77

Source: Federation of Tax Administrators, www.taxadmin.org

Notes:

a) Cook County, IL has an additional $2.00 per pack tax on cigarettes.

b) The City of Chicago has an additional $0.68 per pack tax on cigarettes.

c) WI, IL, and IA have different sales tax rates by city and county, we include these rates, as well as state rates for MN and MI in our analysis. For complete listing of sales tax rates used for all 270 cities in our sample see the Appendix.

Table 2: Twenty Five Largest State Tobacco Tax Increases Since 2000		
	Amount of Increase	Date of Change
Iowa	$1.00	3/1/2007
Maine	$1.00	9/19/2005
Maryland	$1.00	1/1/2008
Montana	$1.00	1/1/2005
South Dakota	$1.00	1/1/2007
Texas	$1.00	1/1/2007
Wisconsin	$1.00	1/1/2008
Arizona	$0.82	12/7/2006
Oklahoma	$0.80	7/1/2004
Massachusetts	$0.75	7/25/2002
Michigan	$0.75	7/1/2004
Minnesota	$0.75	8/1/2005
Rhode Island	$0.75	7/1/2004
New Jersey	$0.70	7/1/2002
New Mexico	$0.70	7/1/2003
Ohio	$0.70	1/1/2005
Vermont	$0.70	7/1/2003
Pennsylvania	$0.69	7/15/2002
Colorado	$0.64	1/1/2005
Connecticut	$0.61	4/3/2002
Alaska	$0.60	1/1/2005
Delaware	$0.60	8/1/2007
Oregon	$0.60	11/1/2002
Washington	$0.60	1/1/2002
Washington	$0.60	7/1/2005
Source: www.taxadmin.org		
Notes:		
a) The largest tobacco tax increase since 2000 was the New York City tax, which increased by $1.42 on 7/2/2002		

Table 3: Summary Statistics for Name Brand Cigarettes (standard deviations in parenthesis)						
	Wisconsin	Illinois	Minnesota	Michigan	Iowa	All States
December 2007 Survey						
Average Price	$3.87	$4.92	$4.31	$5.16	$4.89	$4.36
Standard Deviation (Price)	(0.29)	(1.49)	(0.25)	(0.35)	(0.42)	(0.89)
Minimum Price	$3.41	$3.70	$3.97	$4.31	$4.19	$3.41
Maximum Price	$5.00	$8.93	$5.40	$6.10	$5.60	$8.93
N, Dec 07	466	232	197	60	117	1072
Average Distance to WI border (Miles)	35.84	76.08	38.69	33.09	88.38	50.65
Number of stores within 5 miles of WI border	87	32	43	20	18	200
Average Border Store Price	$3.82	$4.26	$4.32	$4.96	$4.64	$4.18
Average Non-Border Store Price	$3.88	$5.02	$4.30	$5.25	$4.94	$4.40
Average Convenience Store Price	$3.86	$5.01	$4.30	$5.14	$5.02	$4.36
Number of Convenience Stores	369	143	156	54	87	809
Average Grocery Store Price	$3.96	$5.30	$4.39	$5.32	$4.88	$4.51
Number of Grocery Stores	68	43	31	6	8	156
Average Tobacco Store Price	$3.81	$4.27	$4.18	NA	$4.39	$4.16
Number of Tobacco Stores	29	46	10	0	22	107
Average National Chain Store Price	$3.86	$5.30	$4.25	$4.98	$5.01	$4.38
Number of National Chain Stores	197	72	89	32	44	434
January 2008 Survey						
Average Price	$5.00	$4.88	$4.32	$5.22	$4.89	$4.85
	(0.33)	(1.45)	(0.29)	(0.40)	(0.43)	(0.79)
Minimum Price	$3.80	$3.72	$4.05	$4.23	$3.69	$3.69
Maximum Price	$6.63	$8.93	$5.40	$6.47	$5.55	$8.93
N, Jan 08	464	246	208	64	125	1107
Average Distance to WI border (Miles)	35.62	80.14	38.17	34.25	88.64	51.90
Number of stores within 5 miles of WI border	88	33	49	20	19	209
Average Border Store Price	$4.95	$4.24	$4.36	$4.99	$4.70	$4.68
Average Non-Border Store Price	$5.01	$4.99	$4.30	$5.32	$4.93	$4.89
Average Convenience Store Price	$4.99	$4.98	$4.31	$5.21	$5.01	$4.87
Number of Convenience Stores	363	153	167	59	93	835
Average Grocery Store Price	$5.10	$5.21	$4.37	$5.35	$4.81	$4.98
Number of Grocery Stores	70	42	31	5	9	157
Average Tobacco Store Price	$4.89	$4.33	$4.24	NA	$4.42	$4.49
Number of Tobacco Stores	31	51	10	0	23	115
Average National Chain Store Price	$5.00	$5.31	$4.23	$5.01	$5.01	$4.89
Number of National Chain Stores	201	79	96	33	46	455

Table 4: Summary Statistics for Generic Brand Cigarettes (standard deviations in parenthesis)						
	Wisconsin	Illinois	Minnesota	Michigan	Iowa	All States
December 2007 Survey						
Average Price	$3.42	$3.79	$3.99	$4.51	$4.48	$3.83
	(0.32)	(0.33)	(0.20)	(0.83)	(0.47)	(0.52)
Minimum Price	$2.11	$2.66	$3.44	$3.18	$3.54	$2.11
Maximum Price	$4.91	$5.03	$4.70	$6.51	$5.35	$6.51
Average Distance to WI border (Miles)	32.02	95.28	39.27	30.02	88.51	53.75
Number of stores within 5 miles of WI border	53	18	37	5	15	128
Average Border Store Price	$3.47	$3.82	$3.99	$3.78	$4.37	$3.78
Average Non-Border Store Price	$3.41	$3.78	$4.00	$4.84	$4.50	$3.84
Average Convenience Store Price	$3.44	$3.82	$3.99	$4.51	$4.65	$3.86
Number of Convenience Stores	179	57	124	16	67	443
Average Grocery Store Price	$3.34	$3.75	$4.03	NA	$4.43	$3.73
Number of Grocery Stores	35	20	25	0	8	88
Average Tobacco Store Price	$3.43	$3.76	$3.87	NA	$3.98	$3.74
Number of Tobacco Stores	20	29	8	0	21	78
Average National Chain Store Price	$3.43	$3.75	$3.97	$4.46	$4.68	$3.84
Number of National Chain Stores	104	23	67	10	35	239
N, Dec 07	234	106	157	16	96	609
January 2008 Survey						
Average Price	$4.58	$3.93	$4.03	$4.61	$4.50	$4.29
Standard Deviation (Price)	(0.30)	(0.64)	(0.22)	(0.62)	(0.46)	(0.50)
Minimum Price	$3.35	$3.25	$3.24	$3.60	$3.47	$3.24
Maximum Price	$5.90	$7.62	$4.82	$5.40	$5.23	$7.62
Average Distance to WI border (Miles)	31.49	105.95	40.06	56.73	90.18	59.20
Number of stores within 5 miles of WI border	51	21	44	1	15	132
Average Border Store Price	$4.60	$3.88	$4.04	$3.60	$4.37	$4.26
Average Non-Border Store Price	$4.57	$3.94	$4.03	$4.81	$4.52	$4.29
Average Convenience Store Price	$4.58	$4.05	$4.04	$4.61	$4.63	$4.35
Number of Convenience Stores	161	69	132	6	80	448
Average Grocery Store Price	$4.61	$3.96	$4.06	NA	$4.47	$4.26
Number of Grocery Stores	29	19	29	0	7	84
Average Tobacco Store Price	$4.48	$3.70	$3.91	NA	$4.03	$4.00
Number of Tobacco Stores	22	36	9	0	21	88
Average National Chain Store Price	$4.58	$3.98	$4.01	$4.37	$4.69	$4.36
Number of National Chain Stores	104	30	74	4	40	252
N, Jan 08	212	124	170	6	108	620

Table 5: Effect of $1 Tax Increase on Cigarette Prices, Results Using Panel Data					
Name Brand					
	Full Panel (1)	National Chain (2)	Tobacco (3)	Convenience (4)	Grocery (5)
Wisconsin (β_1)	1.1275***	1.117***	1.1023***	1.1316***	1.1313***
	(0.0093)	(0.0154)	(0.0455)	(0.0102)	(0.0217)
95% Confidence for β_1	[1.1093 , 1.1458]	[1.0868 , 1.1472]	[1.0119 , 1.1926]	[1.1116 , 1.1516]	[1.0884 , 1.1742]
N	1002	407	101	753	148
R^2	0.9364	0.9287	0.8555	0.9423	0.949
Generic					
Wisconsin (β_1)	1.1763***	1.2081***	1.1363***	1.1805***	1.1791***
	(0.0246)	(0.0391)	(0.0456)	(0.0309)	(0.0578)
95% Confidence for β_1	[1.1279 , 1.2247]	[1.1308 , 1.2854]	[1.0452 , 1.2274]	[1.1197 , 1.2412]	[1.0637 , 1.2946]
N	474	184	71	338	65
R^2	0.8287	0.8393	0.8997	0.8119	0.8687

*** indicates statistically significant at 1% level, ** at 5% level, * at 10% level.

Notes:

(a) Results include only the sample of stores for which we have both December and January data

(b) Sample includes stores in IA, IL, MN, WI, and the upper peninsula of MI

Table 6: Effect of $1 Tax Increase on Cigarette Prices, Results Using Repeated Cross Section Data

	Name Brand		Generic	
	(1)	(2)	(3)	(4)
Wisconsin (β_1)	-1.0230***	-1.0888***	-1.0367***	-1.0641***
	(0.0628)	(0.0620)	(0.0390)	(0.0383)
January (β_2)	-0.0044	-0.0023	0.0669**	.0663**
	(0.0421)	(0.0413)	(0.0271)	(0.0265)
Wisconsin*January (β_3)	1.1362***	1.1345***	1.0892***	1.0943***
	(0.0644)	(0.0632)	(0.0450)	(0.0439)
National Chain		0.0749**		-0.0058
		(0.0348)		(0.0240)
Tobacco Only Store		-0.4086***		-0.2623***
		(0.0552)		(0.0334)
Grocery Store		0.1642***		-0.0536
		(0.0484)		(0.0333)
95% Confidence for (β_3)	[1.0098 , 1.2627]	[1.0104 , 1.2585]	[1.0009 , 1.1776]	[1.0081 , 1.1805]
N	2179	2179	1229	1229
R^2	0.2779	0.3058	0.5398	0.5631

*** indicates statistically significant at 1% level, ** at 5% level, * at 10% level.

Notes:

(a) Results include the full sample of stores for which we have data on in at least one period

(b) Sample includes stores in IA, IL, MN, WI, and the upper peninsula of MI

(c) The convenience store dummy variable is excluded, results are not sensitive to which dummy variable is excluded

(d) All specifications include state level dummy variables for IL, MN and MI and exclude a dummy variable for IA. The results presented for the coefficient of interest are not sensitive to the state dummy excluded

Table 7: Effect of $1 Tax Increase on Cigarette Prices, Results for Name Brand Cigarettes Using Panel Data by Distance, Separate Regressions by distance measure

	(1)	(2)	(3)	(4)
Wisconsin (β_1)	1.1262***	1.1283***	1.1301***	1.1306***
	(.0087)	(.0094)	(.0098)	(.0109)
Inside 1 Mile (β_2)	-0.0083			
	(.0298)			
Inside 5 Miles (β_2)		0.0135		
		(.0139)		
Inside 10 Miles (β_2)			0.0141	
			(.0124)	
Inside 25 Miles (β_2)				0.0000
				(.0109)
Wisconsin*Inside 1 Mile (β_3)	-0.0205			
	(.0380)			
Wisconsin*Inside 5 Miles (β_3)		-0.0216		
		(.0213)		
Wisconsin*Inside 10 Miles (β_3)			-0.0229	
			(.0192)	
Wisconsin*Inside 25 Miles (β_3)				-0.0172
				(.0172)
95% Confidence for (β_3)	[-.0950, .0540]	[-.0635, .0202]	[-.0606, .0148]	[-.0510 .0167]
N	992	992	992	992
R^2	0.9471	0.9471	0.9471	0.9471

*** indicates statistically significant at 1% level, ** at 5% level, * at 10% level.

Notes:

(a) Results include only the sample of stores for which we have both December and January data

(b) Distance is measured as the straight line distance to the Wisconsin border according to ArcMap GIS software

(c) Sample includes stores in IA, IL, MN, WI, and the upper peninsula of MI

Table 8: Effect of $1 Tax Increase on Cigarette Prices, Results for Generic Cigarettes Using Panel Data by Distance, Separate Regressions by distance measure

	(1)	(2)	(3)	(4)
Wisconsin (β_1)	1.144***	1.1424***	1.1521***	1.1570***
	(.0228)	(.0254)	(.0266)	(.0288)
Inside 1 Mile (β_2)	-0.0069			
	(.0696)			
Inside 5 Miles (β_2)		0.0071		
		(.0304)		
Inside 10 Miles (β_2)			0.0388	
			(.0279)	
Inside 25 Miles (β_2)				0.0297
				(.0247)
Wisconsin*Inside 1 Mile (β_3)	-0.054			
	(.0876)			
Wisconsin*Inside 5 Miles (β_3)		-0.0219		
		(.0492)		
Wisconsin*Inside 10 Miles (β_3)			-0.0538	
			(.0462)	
Wisconsin*Inside 25 Miles (β_3)				-0.0472
				(.0435)
95% Confidence for (β_3)	[-.2261, .1182]	[-.1187, .0748]	[-.1446, .0370]	[-.1328, .0384]
N	460	460	460	460
R^2	0.8585	0.8581	0.8587	0.8586

*** indicates statistically significant at 1% level, ** at 5% level, * at 10% level.

Notes:

(a) Results include only the sample of stores for which we have both December and January data

(b) Distance is measured as the straight line distance to the Wisconsin border according to ArcMap GIS software

(c) Sample includes stores in IA, IL, MN, WI, and the upper peninsula of MI

Table 9: Effect of $1 Tax Increase on Cigarette Prices, Results for Name Brand Cigarettes using Cross Section Data by Distance, Separate Regressions by distance measure

	(1)	(2)	(3)	(4)
Wisconsin*January (β_3)	1.1440***	1.1495***	1.1518***	1.1581***
	(.0651)	(.0699)	(.0722)	(.0793)
Inside 1 Mile (β_4)	-0.4154**			
	(.1625)			
Inside 5 Miles (β_4)		-0.3538***		
		(.0760)		
Inside 10 Miles (β_4)			-.4388***	
			(.0668)	
Inside 25 Miles (β_4)				-.4975***
				(.0590)
Wisconsin*January*Inside 1 Mile (β_7)	-0.073			
	(.2987)			
Wisconsin*January*Inside 5 Miles (β_7)		-0.0506		
		(.1608)		
Wisconsin*January*Inside 10 Miles (β_7)			-0.0429	
			(.1429)	
Wisconsin*January*Inside 25 Miles (β_7)				-0.0331
				(.1263)
95% Confidence for (β_7)	[-.6590 , .5128]	[-.3660 , .2648]	[-.3233 , .2373]	[-.2809 , .2145]
N	2170	2170	2170	2170
R^2	0.3083	0.3175	0.3303	0.347

*** indicates statistically significant at 1% level, ** at 5% level, * at 10% level.

Notes:

(a) Results include the full sample of stores for which we have data on in at least one period

(b) Distance is measured as the straight line distance to the Wisconsin border according to ArcMap GIS software

(c) Sample includes stores in IA, IL, MN, WI, and the upper peninsula of MI

(d) Cross Section results control for store types as well as the full set of interactions between Wisconsin, January, and each distance parameter

(e) The convenience store dummy variable is excluded, results are not sensitive to which dummy variable is excluded

(f) All specifications include state level dummy variables for IL, MN and MI and exclude a dummy variable for IA. The results presented for the coefficient of interest are not sensitive to the state dummy excluded

Table 10: Effect of $1 Tax Increase on Cigarette Prices, Results for Generic Cigarettes using Cross Section Data by Distance, Separate Regressions by distance measure

	(1)	(2)	(3)	(4)
Wisconsin*January (β_3)	1.1001***	1.1163***	1.1439***	1.1422***
	(.0448)	(.0492)	(.0419)	(.0559)
Inside 1 Mile (β_4)	-0.0423			
	(.1074)			
Inside 5 Miles (β_4)		-0.0940**		
		(.0472)		
Inside 10 Miles (β_4)			-0.1303***	
			(.0424)	
Inside 25 Miles (β_4)				-0.1133***
				(.0386)
Wisconsin*January*Inside 1 Mile (β_7)	0.0137			
	(.1964)			
Wisconsin*January*Inside 5 Miles (β_7)		-0.0725		
		(.1045)		
Wisconsin*January*Inside 10 Miles (β_7)			-0.1371	
			(.0953)	
Wisconsin*January*Inside 25 Miles (β_7)				-0.0996
				(.0883)
95% Confidence for (β_7)	[-.2532 , .1685]	[-.2776 , .1324]	[-.3240 , .0498]	[-.2729 , .0736]
N	1224	1224	1224	1224
R^2	0.5723	0.57	0.5778	0.5785

*** indicates statistically significant at 1% level, ** at 5% level, * at 10% level.

Notes:

(a) Results include the full sample of stores for which we have data on in at least one period

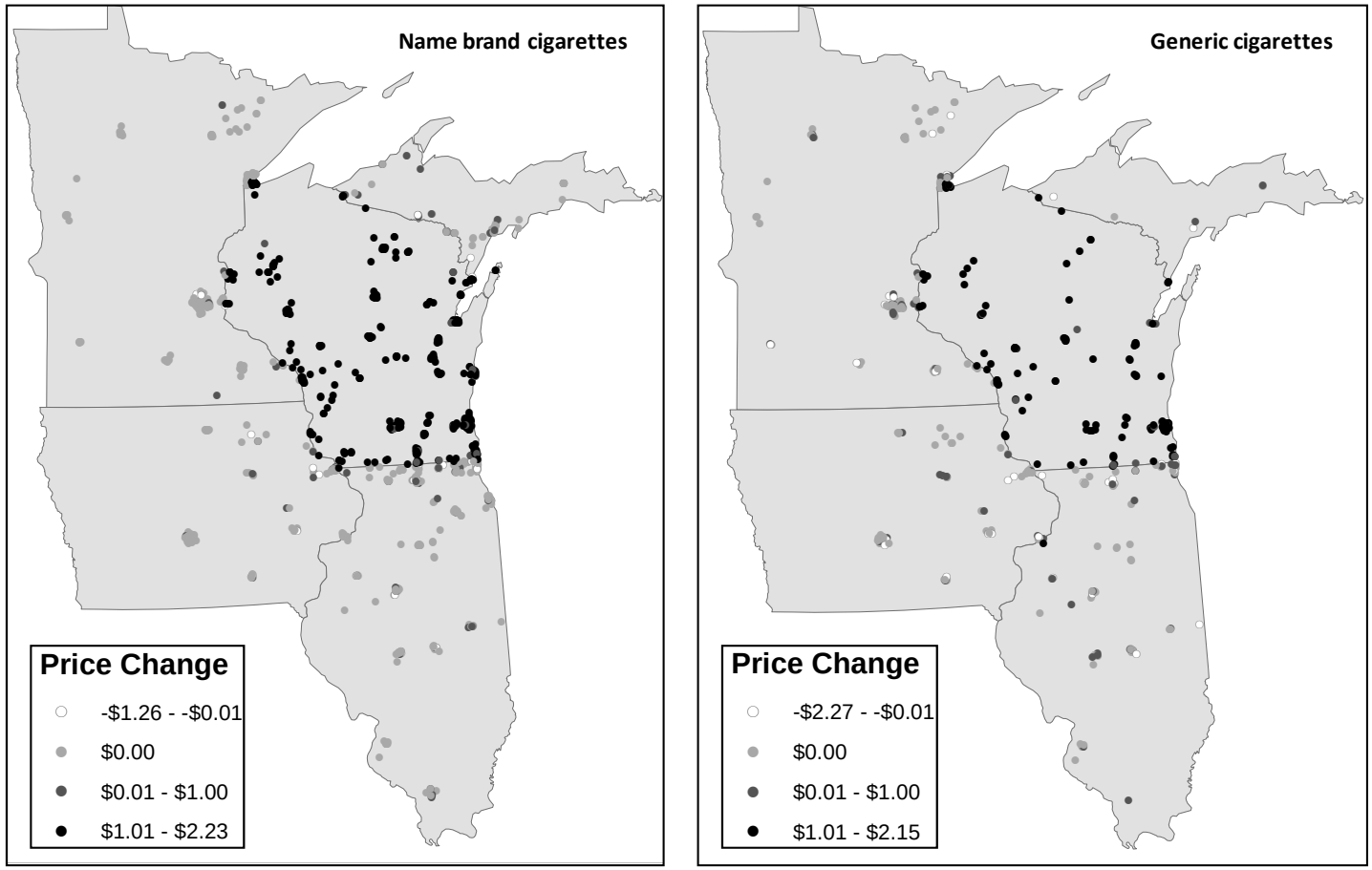
(b) Distance is measured as the straight line distance to the Wisconsin border according to ArcMap GIS software

(c) Sample includes stores in IA, IL, MN, WI, and the upper peninsula of MI

(d) Cross Section results control for store types as well as the full set of interactions between Wisconsin, January, and each distance parameter

(e) The convenience store dummy variable is excluded, results are not sensitive to which dummy variable is excluded

Figure I: Cigarette Price Change, Dec. '07 to Jan. '08



Source: Maps created using Arcmap GIS software, data from survey of cigarette retail establishments

Appendix: Sales Tax Rates by City

Appendix Table 1: Sales Tax Rates by City

City	County	State	Sales Tax Rate
Cedar Falls	Black Hawk	IA	0.0700
Waterloo	Black Hawk	IA	0.0700
Mason City	Cerro Gordo	IA	0.0700
Alta Vista	Chickasaw	IA	0.0700
Fredericksburg	Chickasaw	IA	0.0700
Nashua	Chickasaw	IA	0.0700
New Hampton	Chickasaw	IA	0.0700
Garnavillo	Clayton	IA	0.0700
Guttenberg	Clayton	IA	0.0700
Dubuque	Dubuque	IA	0.0700
Dyersville	Dubuque	IA	0.0700
Farley	Dubuque	IA	0.0700
New Vienna	Dubuque	IA	0.0700
Peosta	Dubuque	IA	0.0700
Worthington	Dubuque	IA	0.0700
Waucoma	Fayette	IA	0.0700
Coralville	Johnson	IA	0.0600
Iowa City	Johnson	IA	0.0600
Cedar Rapids	Linn	IA	0.0600
Marshalltown	Marshall	IA	0.0700
Des Moines	Polk	IA	0.0600
Pleasant Hill	Polk	IA	0.0600
Windsor Heights	Polk	IA	0.0600
Bettendorf	Scott	IA	0.0700
Davenport	Scott	IA	0.0700
Ottumwa	Wapello	IA	0.0700
Princeton	Bureau	IL	0.0725
Champaign	Champaign	IL	0.0775
Urbana	Champaign	IL	0.0775
Chicago	Cook	IL	0.0900
Dekalb	Dekalb	IL	0.0750
Sycamore	Dekalb	IL	0.0700
Clinton	Dewitt	IL	0.0675
Aurora	DuPage	IL	0.0775
Canton	Fulton	IL	0.0725
Carbondale	Jackson	IL	0.0775
De Soto	Jackson	IL	0.0625
Murphysboro	Jackson	IL	0.0725
East Dubuque	Jo Daviess	IL	0.0675
Galena	Jo Daviess	IL	0.0675

Source: Tax Rates are all taken from the respective state department of revenue web pages at: http://www.revenue.state.il.us/, http://www.iowa.gov/tax, http://www.revenue.wi.gov, http://www.michigan.gov/treasury, http://www.taxes.state.mn.us/

Appendix Table 1 (Continued): Sales Tax Rates by City

City	County	State	Sales Tax Rate
Stockton	Jo Daviess	IL	0.0625
Warren	Jo Daviess	IL	0.0625
Warren	Jo Daviess	IL	0.0625
Aurora	Kane	IL	0.0775
North Aurora	Kane	IL	0.0700
Galesburg	Knox	IL	0.0750
La Salle	La Salle	IL	0.0700
Ottawa	La Salle	IL	0.0700
Peru	La Salle	IL	0.0700
Sheridan	La Salle	IL	0.0650
Streator	La Salle	IL	0.0750
Antioch	Lake	IL	0.0650
Beach Park	Lake	IL	0.0750
Fox Lake	Lake	IL	0.0650
Grayslake	Lake	IL	0.0650
Libertyville	Lake	IL	0.0650
North Chicago	Lake	IL	0.0650
Wadsworth	Lake	IL	0.0650
Waukegan	Lake	IL	0.0750
Winthrop Harbor	Lake	IL	0.0650
Zion	Lake	IL	0.0650
Decatur	Macon	IL	0.0800
Mount Zion	Macon	IL	0.0650
Mt Zion	Macon	IL	0.0650
Macomb	McDonough	IL	0.0725
Harvard	McHenry	IL	0.0650
Johnsburg	McHenry	IL	0.0650
Lakemoor	McHenry	IL	0.0650
Mchenry	McHenry	IL	0.0650
Richmond	McHenry	IL	0.0650
Spring Grove	McHenry	IL	0.0650
Waterloo	Monroe	IL	0.0625
Davis	Ogle	IL	0.0625
Bartonville	Peoria	IL	0.0650
Peoria	Peoria	IL	0.0800
West Peoria	Peoria	IL	0.0800
Moline	Rock Island	IL	0.0725
Chatham	Sangamon	IL	0.0625
Springfield	Sangamon	IL	0.0775
Belleville	St. Clair	IL	0.0760

Source: Tax Rates are all taken from the respective state department of revenue web pages at: http://www.revenue.state.il.us/, http://www.iowa.gov/tax, http://www.revenue.wi.gov, http://www.michigan.gov/treasury, http://www.taxes.state.mn.us/

Appendix Table 1 (Continued): Sales Tax Rates by City

City	County	State	Sales Tax Rate
Dakota	Stephenson	IL	0.0675
Freeport	Stephenson	IL	0.0725
Rock City	Stephenson	IL	0.0675
Winslow	Stephenson	IL	0.0675
Danville	Vermilion	IL	0.0775
Cambria	Williamson	IL	0.0625
Durand	Winnebago	IL	0.0725
Machesney Park	Winnebago	IL	0.0725
Rockford	Winnebago	IL	0.0825
Rockton	Winnebago	IL	0.0725
Roscoe	Winnebago	IL	0.0725
South Beloit	Winnebago	IL	0.0725
Vulcan	Alger	MI	0.0600
Bark River	Delta	MI	0.0600
Escanaba	Delta	MI	0.0600
Garden	Delta	MI	0.0600
Gladstone	Delta	MI	0.0600
Rapid River	Delta	MI	0.0600
Wells	Delta	MI	0.0600
Iron Mountain	Dickinson	MI	0.0600
Kingsford	Dickinson	MI	0.0600
Norway	Dickinson	MI	0.0600
Ironwood	Gogebic	MI	0.0600
Wakefield	Gogebic	MI	0.0600
Watersmeet	Gogebic	MI	0.0600
Nisula	Houghton	MI	0.0600
Toivola	Houghton	MI	0.0600
Caspian	Iron	MI	0.0600
Crystal Falls	Iron	MI	0.0600
Iron River	Iron	MI	0.0600
Mc Millan	Luce	MI	0.0600
Newberry	Luce	MI	0.0600
Engadine	Mackinac	MI	0.0600
Carney	Menominee	MI	0.0600
Menominee	Menominee	MI	0.0600
Powers	Menominee	MI	0.0600
Spalding	Menominee	MI	0.0600
Stephenson	Menominee	MI	0.0600
Ontonagon	Ontonagon	MI	0.0600
Bergland	Ontonagon	MI	0.0600

Source: Tax Rates are all taken from the respective state department of revenue web pages at: http://www.revenue.state.il.us/, http://www.iowa.gov/tax, http://www.revenue.wi.gov, http://www.michigan.gov/treasury, http://www.taxes.state.mn.us/

Appendix Table 1 (Continued): Sales Tax Rates by City

City	County	State	Sales Tax Rate
Cooks	Schoolcraft	MI	0.0600
Seney	Schoolcraft	MI	0.0600
Blaine	Anoka	MN	0.0650
Columbia Heights	Anoka	MN	0.0650
Coon Rapids	Anoka	MN	0.0650
Detroit Lakes	Becker	MN	0.0650
Bemidji	Beltrami	MN	0.0650
Mankato	Blue Earth	MN	0.0650
Center City	Chisago	MN	0.0650
Shafer	Chisago	MN	0.0650
Taylors Falls	Chisago	MN	0.0650
Red Wing	Goodhue	MN	0.0650
Brooklyn Center	Hennepin	MN	0.0650
Brooklyn Park	Hennepin	MN	0.0650
Edina	Hennepin	MN	0.0650
Golden Valley	Hennepin	MN	0.0650
Minneapolis	Hennepin	MN	0.0650
Plymouth	Hennepin	MN	0.0650
Richfield	Hennepin	MN	0.0650
St Louis Park	Hennepin	MN	0.0650
La Crescent	Houston	MN	0.0650
Marshall	Lyon	MN	0.0650
Austin	Mower	MN	0.0650
North Mankato	Nicollet	MN	0.0650
Rochester	Olmsted	MN	0.0650
Fergus Falls	Otter Tail	MN	0.0650
St Paul	Ramsey	MN	0.0650
Babbitt	St. Louis	MN	0.0650
Britt	St. Louis	MN	0.0650
Cook	St. Louis	MN	0.0650
Duluth	St. Louis	MN	0.0650
Ely	St. Louis	MN	0.0650
Eveleth	St. Louis	MN	0.0650
Gilbert	St. Louis	MN	0.0650
Hermantown	St. Louis	MN	0.0650
Hibbing	St. Louis	MN	0.0650
Hoyt Lakes	St. Louis	MN	0.0650
Proctor	St. Louis	MN	0.0650
Tower	St. Louis	MN	0.0650
Lake Elmo	Washington	MN	0.0650

Source: Tax Rates are all taken from the respective state department of revenue web pages at: http://www.revenue.state.il.us/, http://www.iowa.gov/tax, http://www.revenue.wi.gov, http://www.michigan.gov/treasury, http://www.taxes.state.mn.us/

Appendix Table 1 (Continued): Sales Tax Rates by City

City	County	State	Sales Tax Rate
Lakeland	Washington	MN	0.0650
Stillwater	Washington	MN	0.0650
Woodbury	Washington	MN	0.0650
Rollingstone	Winona	MN	0.0650
Winona	Winona	MN	0.0650
Almena	Barron	WI	0.0550
Barron	Barron	WI	0.0550
Barronett	Barron	WI	0.0550
Belmont	Barron	WI	0.0550
Chetek	Barron	WI	0.0550
Dallas	Barron	WI	0.0550
Mikana	Barron	WI	0.0550
Rice Lake	Barron	WI	0.0550
Green Bay	Brown	WI	0.0550
Fountain City	Buffalo	WI	0.0550
Chippewa Falls	Chippewa	WI	0.0550
Gays Mills	Crawford	WI	0.0550
Prairie Du Chien	Crawford	WI	0.0550
Soldiers Grove	Crawford	WI	0.0550
Madison	Dane	WI	0.0550
Mc Farland	Dane	WI	0.0550
Middleton	Dane	WI	0.0550
Monona	Dane	WI	0.0550
Sister Bay	Door	WI	0.0550
Superior	Douglas	WI	0.0550
Eau Claire	Eau Claire	WI	0.0550
Fond Du Lac	Fond Du Lac	WI	0.0500
N Fond Du Lac	Fond Du Lac	WI	0.0500
Crandon	Forest	WI	0.0550
Laona	Forest	WI	0.0550
Bloomington	Grant	WI	0.0550
Cassville	Grant	WI	0.0550
Cuba City	Grant	WI	0.0550
Dickeyville	Grant	WI	0.0550
Hazel Green	Grant	WI	0.0550
Platteville	Grant	WI	0.0550
Monroe	Green	WI	0.0550
Hurley	Iron	WI	0.0550
Black River Falls	Jackson	WI	0.0550
Fort Atkinson	Jefferson	WI	0.0550

Source: Tax Rates are all taken from the respective state department of revenue web pages at: http://www.revenue.state.il.us/, http://www.iowa.gov/tax, http://www.revenue.wi.gov, http://www.michigan.gov/treasury, http://www.taxes.state.mn.us/

Appendix Table 1 (Continued): Sales Tax Rates by City

City	County	State	Sales Tax Rate
Jefferson	Jefferson	WI	0.0550
Johnson Creek	Jefferson	WI	0.0550
Watertown	Jefferson	WI	0.0550
Mauston	Juneau	WI	0.0550
New Lisbon	Juneau	WI	0.0550
Kenosha	Kenosha	WI	0.0550
Pleasant Prairie	Kenosha	WI	0.0550
Twin Lakes	Kenosha	WI	0.0550
Holmen	La Crosse	WI	0.0550
West Salem	La Crosse	WI	0.0550
LaCrosse	LaCrosse	WI	0.0550
Gratiot	Lafayette	WI	0.0550
South Wayne	Lafayette	WI	0.0550
Tomahawk	Lincoln	WI	0.0550
Wausau	Marathon	WI	0.0550
Crivitz	Marinette	WI	0.0550
Marinette	Marinette	WI	0.0550
Peshtigo	Marinette	WI	0.0550
Pound	Marinette	WI	0.0550
Greenfield	Milwaukee	WI	0.0560
Milwaukee	Milwaukee	WI	0.0560
Wauwatosa	Milwaukee	WI	0.0560
West Allis	Milwaukee	WI	0.0560
Sparta	Monroe	WI	0.0550
Tomah	Monroe	WI	0.0550
Oconto	Oconto	WI	0.0550
Lake Tomahawk	Oneida	WI	0.0550
Monico	Oneida	WI	0.0550
Pelican Lake	Oneida	WI	0.0550
Rhinelander	Oneida	WI	0.0550
Three Lakes	Oneida	WI	0.0550
Appleton	Outagamie	WI	0.0500
Dresser	Polk	WI	0.0550
Osceola	Polk	WI	0.0550
Osceola	Polk	WI	0.0550
Saint Croix Falls	Polk	WI	0.0550
St Croix Falls	Polk	WI	0.0550
Stevens Point	Portage	WI	0.0550
Racine	Racine	WI	0.0510
Sturtevant	Racine	WI	0.0510

Source: Tax Rates are all taken from the respective state department of revenue web pages at: http://www.revenue.state.il.us/, http://www.iowa.gov/tax, http://www.revenue.wi.gov, http://www.michigan.gov/treasury, http://www.taxes.state.mn.us/

Appendix Table 1 (Continued): Sales Tax Rates by City

City	County	State	Sales Tax Rate
Viola	Richland	WI	0.0550
Beloit	Rock	WI	0.0550
Janesville	Rock	WI	0.0550
Cecil	Shawano	WI	0.0550
Shawano	Shawano	WI	0.0550
Howards Grove	Sheboygan	WI	0.0500
Oostburg	Sheboygan	WI	0.0500
Plymouth	Sheboygan	WI	0.0500
Sheboygan	Sheboygan	WI	0.0500
Sheboygan Falls	Sheboygan	WI	0.0500
Hudson	St. Croix	WI	0.0550
Arcadia	Trempealeau	WI	0.0550
Galesville	Trempealeau	WI	0.0550
Independence	Trempealeau	WI	0.0550
Trempealeau	Trempealeau	WI	0.0550
La Farge	Vernon	WI	0.0550
Ontario	Vernon	WI	0.0550
Viroqua	Vernon	WI	0.0550
Presque Isle	Vilas	WI	0.0550
Genoa City	Walworth	WI	0.0550
Pell Lake	Walworth	WI	0.0550
Walworth	Walworth	WI	0.0550
Sarona	Washburn	WI	0.0550
Waukesha	Waukesha	WI	0.0510
Coloma	Waushara	WI	0.0550
Redgranite	Waushara	WI	0.0550
Wautoma	Waushara	WI	0.0550
Menasha	Winnebago	WI	0.0500
Oshkosh	Winnebago	WI	0.0500
Marshfield	Wood	WI	0.0550
Wisconsin Rapids	Wood	WI	0.0550

Source: Tax Rates are all taken from the respective state department of revenue web pages at: http://www.revenue.state.il.us/, http://www.iowa.gov/tax, http://www.revenue.wi.gov, http://www.michigan.gov/treasury, http://www.taxes.state.mn.us/